

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BPCL 10047	<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416 WIPO PCT
International application No. PCT/GB2004/003302	International filing date (day/month/year) 30.07.2004	Priority date (day/month/year) 21.08.2003	
International Patent Classification (IPC) or national classification and IPC B01J23/28, B01J23/30, C07C51/225, C07C51/25, C07C5/48, C07C67/05			
Applicant BP CHEMICALS LIMITED et al.			

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> <i>(sent to the applicant and to the International Bureau) a total of sheets, as follows:</i></p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> <i>(sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)), containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</i></p>
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>

Date of submission of the demand 10.03.2005	Date of completion of this report 10.08.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Besselmann, S Telephone No. +49 89 2399- 

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/GB2004/003302

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
    - international search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4)
    - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

**Description, Pages**

1-19 as originally filed

**Claims, Numbers**

1-42 as originally filed

a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3.  The amendments have resulted in the cancellation of:
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):
4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
PCT/GB2004/003302

---

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

---

**1. Statement**

Novelty (N)	Yes: Claims	17,38-42
	No: Claims	1-16,18-37
Inventive step (IS)	Yes: Claims	-
	No: Claims	17,38-42
Industrial applicability (IA)	Yes: Claims	1-42
	No: Claims	-

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

---

**Box No. VII Certain defects in the international application**

---

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

---

**Box No. VIII Certain observations on the international application**

---

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item V.**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. The following documents are referred to in this communication:

D1 : EP 0 294 846 A  
D2 : WO 03/033138 A  
D3 : US 4 524 236 A  
D4 : US 2003/088118 A1

2. DOCUMENT D1

Document D1 relates to the production of acetic acid from ethane, ethylene and oxygen. D1 discloses a catalyst comprising an intimate mixture of (4 g)  $\text{MoVNbO}_x$  and (2 g)  $\text{SnMoO}_y$  (examples 23, 24). The overall composition falls within the ranges defined in claim 1. The catalyst may be used with a support (col. 4, line 21).

- 2.1 INDEPENDENT CLAIM 1

As can be seen from the above, document D1 discloses in combination all the features defined in independent claim 1. Hence the subject-matter of this claim is not new (Article 33(2) PCT).

- 2.2 INDEPENDENT CLAIM 21

The  $\text{MoVNbO}_x$  and  $\text{SnMoO}_y$  oxides are individually prepared by a method involving the steps of drying and calcining a mixture.  $\text{MoVNbO}_x$  and  $\text{SnMoO}_y$  are combined in a subsequent step, e.g. by wet combination and further drying (page 3, line 55 - page 4, line 21).

Present claim 21 does not specify any calcination conditions. The drying step described in D1 as well as the step of exposing the catalyst to reaction atmosphere at a temperature of 256 °C may therefore be regarded as calcination steps. For these reasons, the subject-matter of claim 21 is not new.

In addition to that, it is pointed out that the preparation process used in the application constitutes an obvious alternative to the process known from D1 since the same product and the same catalyst performance appear to be obtained. The variation of the order of process steps as such falls within the routine practice of

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/GB2004/003302

the skilled person.

**2.3 INDEPENDENT CLAIM 28**

As can be seen from the above, document D1 discloses in combination all the features defined in independent claim 28. Hence the subject-matter of this claim is not new (Article 33(2) PCT).

**3. DOCUMENT D3**

D3 relates to the oxydehydrogenation of ethane with formation of acetic acid as byproduct (col. 1, lines 43-46). Depending on the reaction conditions used, the ratio of ethylene:acetic acid production may reach 1 (col. 5, lines 28-31).

D3 discloses a catalyst containing Mo, V, Nb, Sb and Pb (example 9), with the gram atom ratios of Mo, V and Nb falling within claim 1. As is clear from the general teaching, the gram atom ratio of Pb may amount to up to 1 (see claim 1). The catalyst may be used with a support (col. 3, lines 15-16). It is prepared by a process involving drying and calcining a mixture (example 1; col. 3, lines 16-46).

The subject-matter of independent claims 1, 21 and 28 therefore also lacks novelty over D3.

**4. DOCUMENT D4**

D4 relates to catalysts for producing an unsaturated carboxylic acid or an unsaturated nitrile.

The catalyst contains Mo, V, Nb, Ti and Sn, the gram atom ratios falling within claim 1 (examples 2, 3, 14, 15). The catalyst is prepared by drying and calcining a mixture (paragraphs [0298] - [0304]).

The subject-matter of independent claims 1 and 21 therefore also lacks novelty over D4.

**5. DOCUMENT D2**

D2 relates to the production of acetic acid from ethane. According to D2, the product may be converted further to vinyl acetate (page 4, line 29 - page 5, line 21). D2 discloses catalysts containing Mo, V, Nb, Au and Sn (catalysts B, C). The catalysts are prepared by drying and calcining a mixture.

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/GB2004/003302

**5.1 INDEPENDENT CLAIM 1**

In view of the above, the subject-matter of claim 1 differs from D2 in the tin gram atom ratio. However, no effect related to this difference is derivable from the present application. The subject-matter of claim 1 therefore does not involve an inventive step over D2.

**5.2 INDEPENDENT CLAIMS 21 AND 28**

For the same reasons (cf. item 5.1), the method of preparing the catalyst and the process using the catalyst defined in claims 21 and 28 do not involve an inventive step over D2.

**6.1 DEPENDENT CLAIMS 2-20**

Dependent claims 2-20 do not appear to contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

In particular, the combined use of Sn and Ti is not novel in view of D4 (cf. item 4). Furthermore, no technical effect which might support an inventive step of the presence of Sn in combination with Ti is apparent from the examples given in the application. The catalysts have been tested at different temperatures and the selectivities relate to different conversions, such that no meaningful comparison of the selectivities is possible.

**6.2 DEPENDENT CLAIMS 22-27**

Claims 22-27 define a standard method of preparing Mo-V mixed oxide catalysts (see D2, D3, D4) which would only be novel and inventive if the product thereby obtained was novel and inventive. This is not the case (see above).

**6.3 DEPENDENT CLAIMS 29-42**

Dependent claims 29-42 do not appear to contain any additional features which might support novelty and/or inventive step.

Regarding claims 38-42, it is already known from D2 that the acetic acid and ethylene produced may be used for vinyl acetate production (page 4, last paragraph). The skilled person would apply this general teaching to any process

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/GB2004/003302

of producing acetic acid / ethylene, e.g. the processes known from D1 and D3.

7. Industrial applicability of the claimed subject-matter is acknowledged.

**Re Item VII**

**Certain defects in the international application**

8. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D3 is not mentioned in the description, nor are these documents identified therein.

**Re Item VIII**

**Certain observations on the international application**

9. Claims 31, 32, 36, 37, 39 and 42 define the process with respect to the selectivities / product ratios to be obtained. This definition merely amounts to a statement of the underlying problem and is therefore not allowable (Art. 6 PCT).